

**The Business Dynamics Statistics:
Describing the Evolution of the U.S. Economy from 1978-2019**

by

**Christopher Goetz
U.S. Census Bureau**

**Martha Stinson
U.S. Census Bureau**

CES 21-33

October 2021

The research program of the Center for Economic Studies (CES) produces a wide range of economic analyses to improve the statistical programs of the U.S. Census Bureau. Many of these analyses take the form of CES research papers. The papers have not undergone the review accorded Census Bureau publications and no endorsement should be inferred. Any opinions and conclusions expressed herein are those of the author(s) and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed. Republication in whole or part must be cleared with the authors.

To obtain information about the series, see www.census.gov/ces or contact Christopher Goetz, Editor, Discussion Papers, U.S. Census Bureau, Center for Economic Studies 5K038E, 4600 Silver Hill Road, Washington, DC 20233, CES.Working.Papers@census.gov. To subscribe to the series, please click [here](#).

Abstract

The U.S. Census Bureau's Business Dynamics Statistics (BDS) provide annual measures of how many businesses begin, end, or continue their operations and the associated job creation and destruction. The BDS is a valuable resource for information on the U.S. economy because of its long time series (1978-2019), its complete coverage (all private sector, non-farm U.S. businesses), and its tabulations for both individual establishments and the firms that own and control them. In this paper, we use the publicly available BDS data to describe the dynamics of the economy over the past 40 years. We highlight the increasing concentration of employment at old and large firms and describe net job creation trends in the manufacturing, retail, information, food/accommodations, and healthcare industry sectors. We show how the spatial distribution of employment has changed, first moving away from the largest cities and then back again. Finally, we show long-run trends for a group of industries we classify as high-tech and explore how the share of employment at small and young firms has changed for this part of the economy.

* Any opinions and conclusions expressed herein are those of the author(s) and do not necessarily reflect the views of the US Census Bureau. This paper uses publicly available data that have been protected by noise infusion to ensure that no confidential data are disclosed.

Contact – Goetz: Center for Economic Studies, U.S. Census Bureau, christopher.f.goetz@census.gov Stinson: Center for Economic Studies, U.S. Census Bureau, martha.stinson@census.gov

1. Introduction

Over the past four decades millions of firms and their employees have churned in and out of the U.S. economy, creating a constantly evolving and dynamic environment. To help depict and study the nature of these changes, the Business Dynamics Statistics (BDS) from the U.S. Census Bureau provide annual measures of establishment openings and closings, firm startups and shutdowns, and job creation and destruction. These measures are available for the entire economy, and by industry sector, 3-digit and 4-digit NAICS classification, state, Metropolitan and Micropolitan Statistical Area, and county. They are also published by firm and establishment size and age. With the latest release in September 2021, the time series is available from 1978-2019.¹ In this brief, we use the publicly available statistics to describe the dynamics of the U.S. economy over the past 40 years.

2. Firm Size and Age

The BDS publishes statistics broken down by firm age as well as by firm size. Age and size are important characteristics of a business and potentially reflect information about their tendencies to create jobs and economic growth. The BDS allows us to distinguish between the age and size of an establishment (a particular physical place of work), and the age and size of the firm (the larger business enterprise that owns and operates the establishment). Firm age is defined as the age of the oldest establishment in the first year in which a firm has positive employment. If all establishments with employment in the firm are themselves age zero, the

¹ For more information on the creation of the BDS, please see the working paper “Redesigning the Longitudinal Business Database,” located at the following URL: <https://www.census.gov/library/working-papers/2021/adrm/CES-WP-21-08.html>

firm is considered a start-up. In subsequent years, the firm ages chronologically, accruing a year of age for each calendar year. Establishments are tracked across mergers, acquisitions, and other changes in ownership, and retain their *establishment age* based on their own start date. However, establishments that join already existing firms take on the previously assigned *firm age* of the new enterprise.

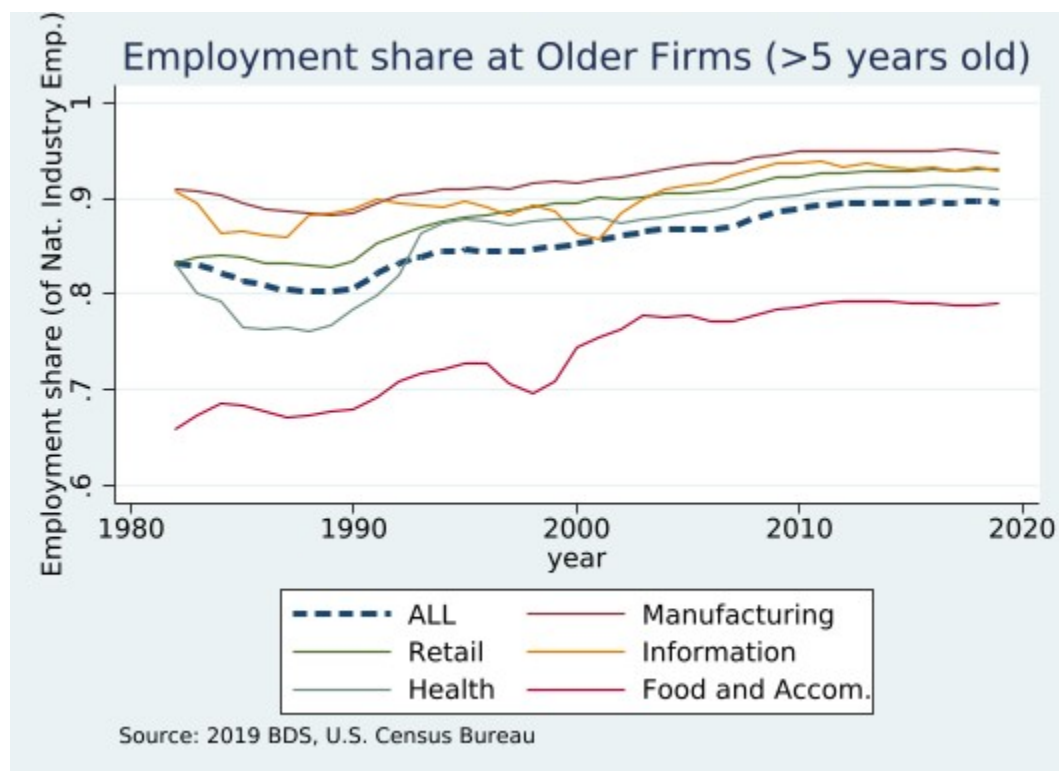
The BDS are published for both firm and establishment age categories of 0 (new firms), 1, 2, 3, 4, 5, 6-10, 11-15, 16-20, 21-25, and 26+ years old as well as left-censored firms (born before 1976). When considering employment trends over time, firm age is often more relevant than establishment age. Establishments born to new firms will have job creation patterns that resemble other start-ups while establishments born to long-existing firms will grow in ways that reflect trends at mature firms. For the purposes of this paper, we collapse the detailed groupings to form two age categories: firms with positive employment for five years or less (young) and firms with positive employment for more than 5 years (old).

A firm's size is based on the quarter 1 (March 12th) employment of a given year, and includes all establishments associated with the firm at that time. Size categories are published for employment ranges of 1-4, 5-9, 10-19, 20-99, 100-499, 500-999, 1000-2499, 2500-4999, 5000-9999, and 10000+. For this paper, we will classify firms by whether they have 500 or more employees (large) or fewer than 500 employees (small).

One of the major trends over the past three decades is that employment has become increasingly concentrated at older, more established firms over time. Figure 1 shows the share of national employment represented by firms that are older than 5 years, as opposed to

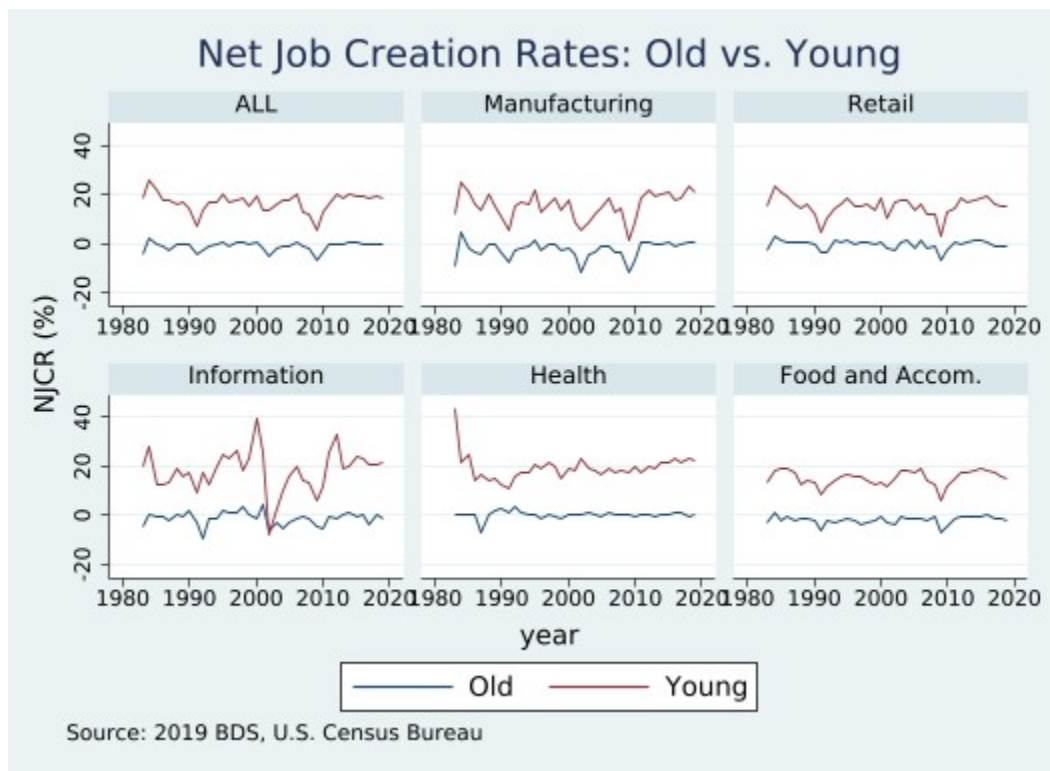
employment at firms 5 years old and younger. After falling in the 1980's, the share of employment at more mature firms has risen steadily, representing approximately 90% of all employees by 2019. As also shown in Figure 1, the patterns in a few notable industries mirror this national trend. By the mid-2000's, the Manufacturing, Retail, and Healthcare sectors all had over 90% of their employment at mature firms. The exceptions to this trend are Food/Accommodation and Information. Restaurants and hotels have a lower share of employment in older firms relative to other industries over the entire time series. This share dipped even lower in the late 1990's, then rose till the early 2010's, and has been flat or slightly declining since. The Information sector trended somewhat away from older firms through the tech crash in the early 2000's but has risen since and is now nearly 95% concentrated in mature firms.

Figure 1.



The large and increasing presence of employment at older firms appears to contrast with the notion that young startup firms are the engine of economic growth. However, it is true that young firms are more dynamic and have much greater rates of net job creation. Figure 2 plots the net job creation rate (NJCR) of old firms and young firms, in the overall economy and for certain industries. The NJCR indicates how many more jobs were created than were destroyed relative to overall employment in the industry.

Figure 2.

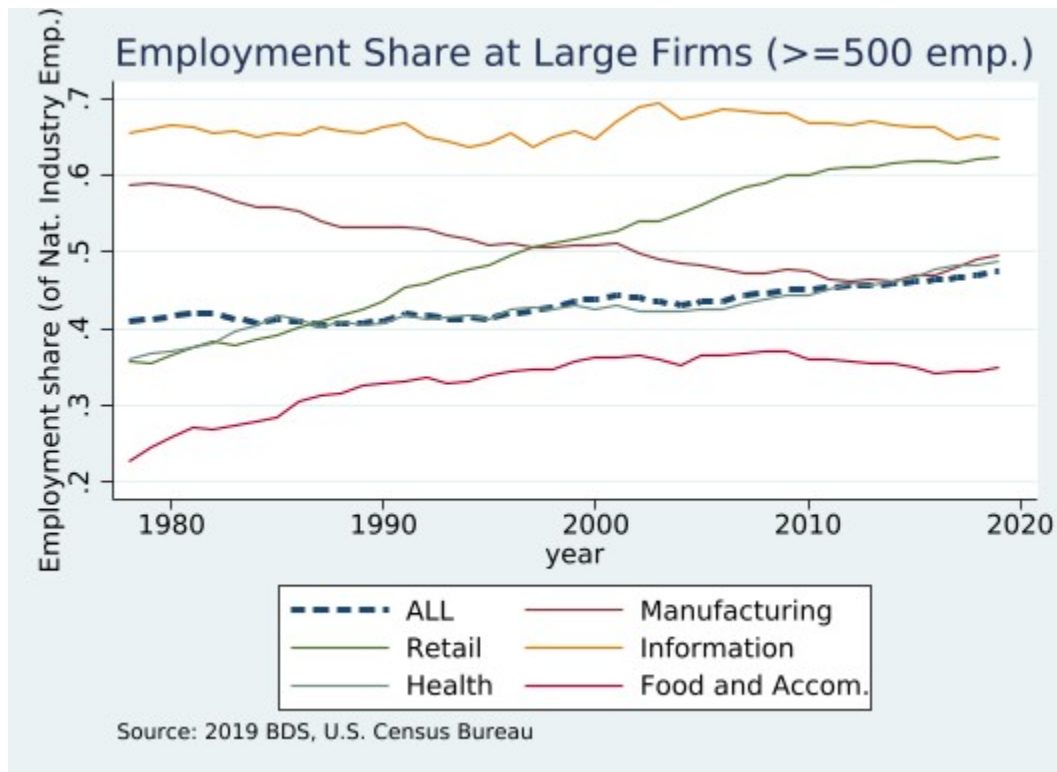


We observe that the rate is notably higher for young firms versus older ones – while the NJCR has hovered around 15-20% for the younger firms throughout the time series, it is roughly 0% and often negative for more established firms.² Although NJCR time series is more volatile for young firms than old ones, with larger drops during business contractions and larger gains in expansions (e.g. Retail and Manufacturing during and after the Great Recession), the rate is always higher for young firms. The single exception is the Information sector in 2001, when the job creation rate for young firms fell to the same level as for old firms. Therefore, it is simultaneously true that startups grow at faster rates, but that the sheer presence of older firms means that the economy is increasingly relying on more established firms to employ workers.

Mirroring the growth of older firms, there has been a similar increase in the share of employment located at large firms with at least 500 employees. Figure 3 shows that the national share of employment at such firms has grown from 41% at the beginning of the time series to 48% at the end in 2019. However, this steady rise in the national share masks considerable industry variation. Manufacturing has notably defied this trend, becoming more concentrated in smaller firms, despite a slight reversal of this pattern in the latest few years. The Information and Food/Accommodation sectors have also moved away from larger firms since the mid-2000's, despite moving towards them during other time periods.

² In a firm's first year of operation, all employment is counted as job creation. Thus, the age 0 group of firms is the largest contributor to net job creation by young firms (less than 5 years old). For a breakdown by more detailed age categories, see BDS table Firm Age (bds201_fa.csv).

Figure 3.

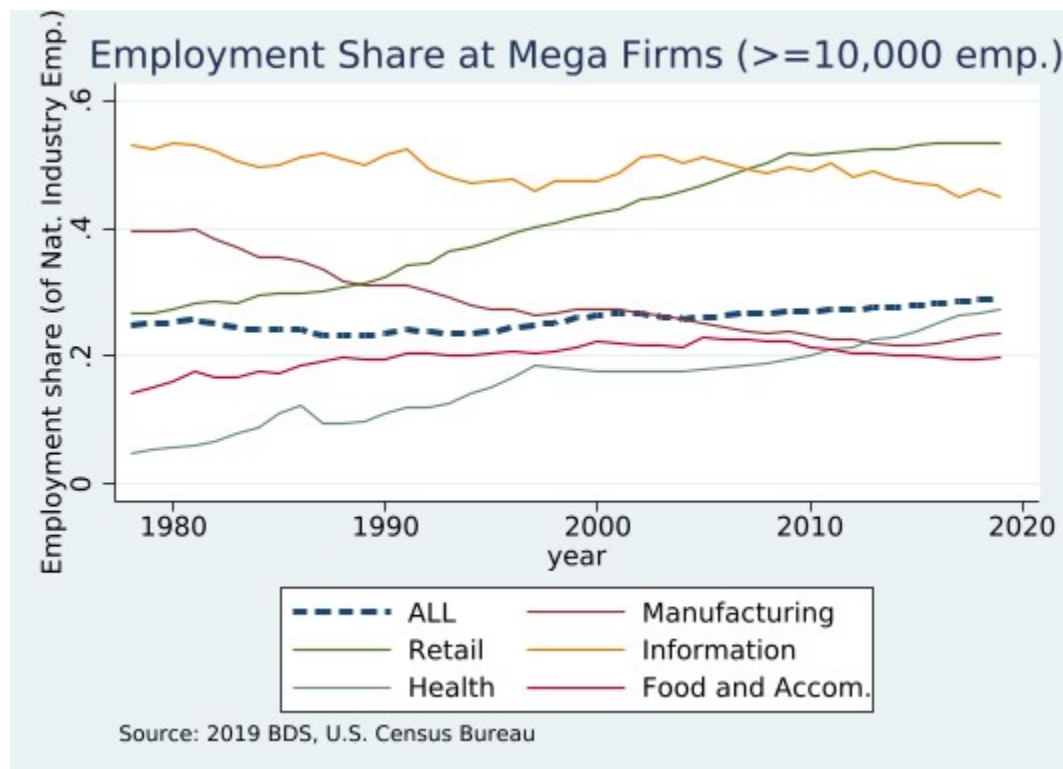


The increasing concentration of employment at large firms is most obvious in the Retail sector, which grew steadily from 36% in 1978 to 62% share in 2019. Retail's status as an industry dominated by large players is well-known, with the familiar rise of so-called "megafirms" that have crowded out smaller mom-and-pop shops during the last two decades. Recent research suggests that the increasing presence of such firms helps explain the decline in the share of national income going to labor, as these firms tend to be capital intensive and highly efficient (Autor et al., 2020).

Figure 4 shows the share of employment at these megafirms employing over 10,000 people. We see that the concentration of Retail employment located at such firms has more than doubled over time and accounts for nearly all the rise in the share of large firms in the

previous figure. Healthcare has also seen a steady, although slower, upward trend in employment at megafirms. Nevertheless, the share of employment at megafirms in the overall economy remains only around 25%.

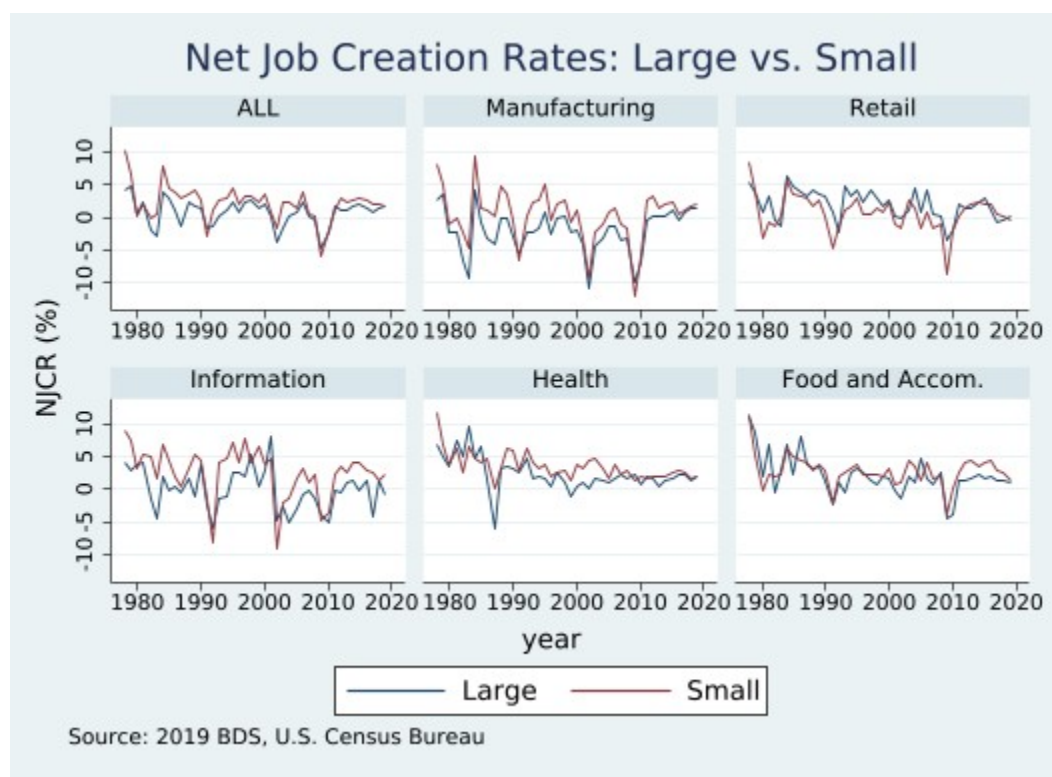
Figure 4.



The implications for job creation due to the rise of larger firms are less clear. As shown in Figure 5, small firms have higher rates of job growth than large ones, but not by nearly the same margin as between young and old firms (see Figure 2). During economic expansions, the net job creation rate of small firms exceeds that of large firms by a few percentage points. However during contractions, the rates fall to nearly the same negative level as large firms. This

is especially apparent in the Information sector during the 2001 recession, where small firms destroyed jobs at a higher rate than large ones. The NJCR in this sector remains lower today than in the 1990s but aside from the Great Recession, small firms have created more jobs on net than large ones since the mid-2000's.

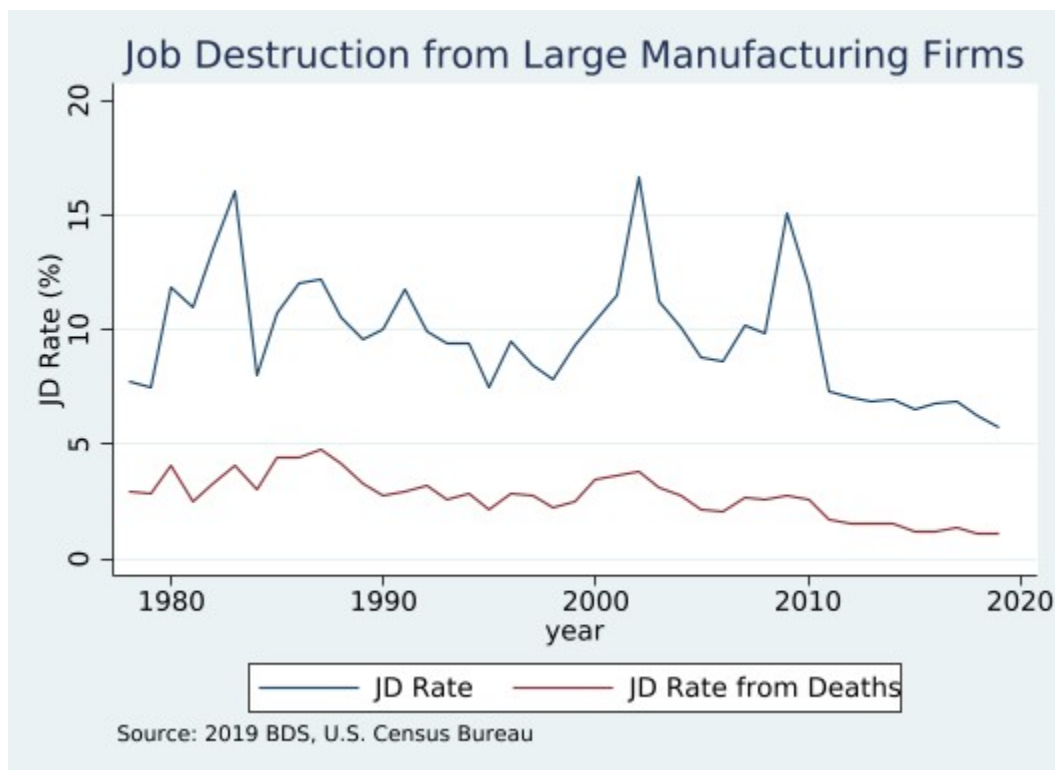
Figure 5.



This trend in lower net job creation rates for large firms also explains the declining share of manufacturing employment at large firms. Net job creation by large manufacturing firms has been largely negative since the mid-1980s, meaning that these firms have destroyed more jobs than they have created. Although the NJCR for this group has recently become positive, it is still

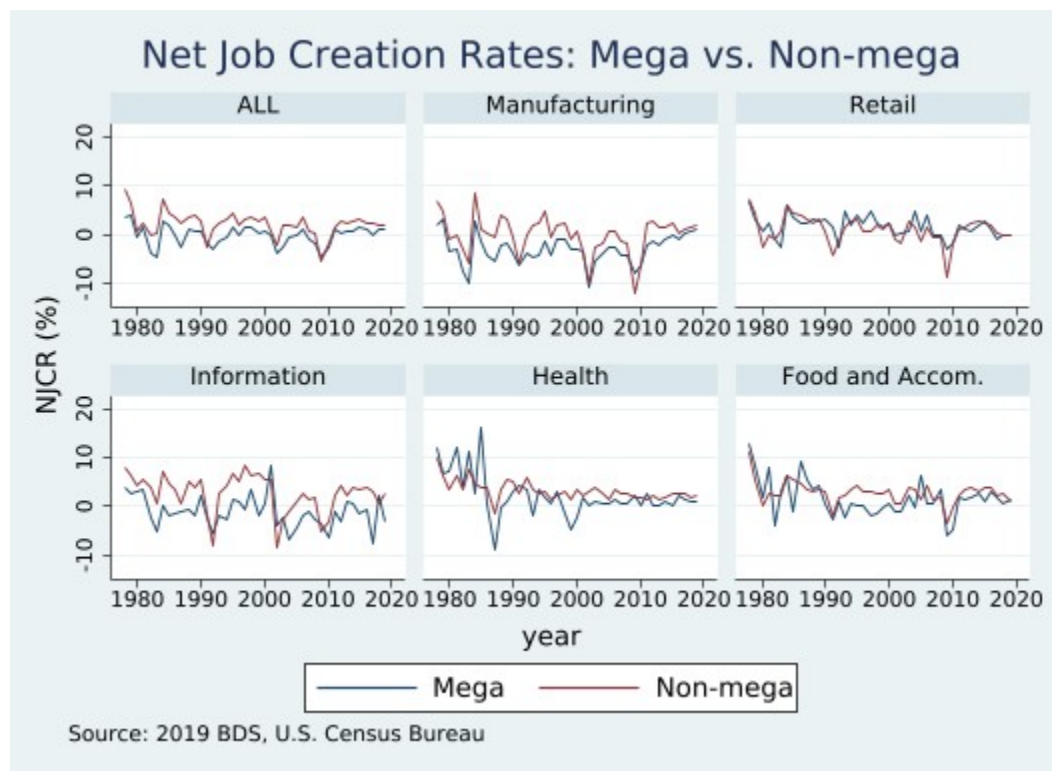
low (1.7% in 2019). This trend leads to an interesting question – are large firms going out of business or are they shrinking in size? To answer this, in Figure 6 we compare the job destruction rate from exiting establishments (which includes employment loss from both plant and total firm closure) to the total job destruction rate among all manufacturing establishments that belong to large firms. Employment lost from firms that die or close plants each year is low relative to the employment lost overall, meaning that large manufacturing firms that continue to operate destroy more jobs than those closing. Considering the trends in both net job creation and job destruction, we conclude that large manufacturing firms have been shrinking in size, not going out of business.

Figure 6.



The exception to this trend of stagnant job growth at large firms is Retail, where large firms have mostly out-performed small firms with regards to the NJCR. Figure 7 shows the different rates for mega-firms versus non-mega firms and here we see similar patterns. Mega firms in retail had a high NJCR in the early 2000s and did not experience as severe of a drop in the Great Recession as non-mega firms. In the most recent years, mega and non-mega firms have performed similarly in Retail while in other sectors, the non-mega firms have created jobs at a higher rate.

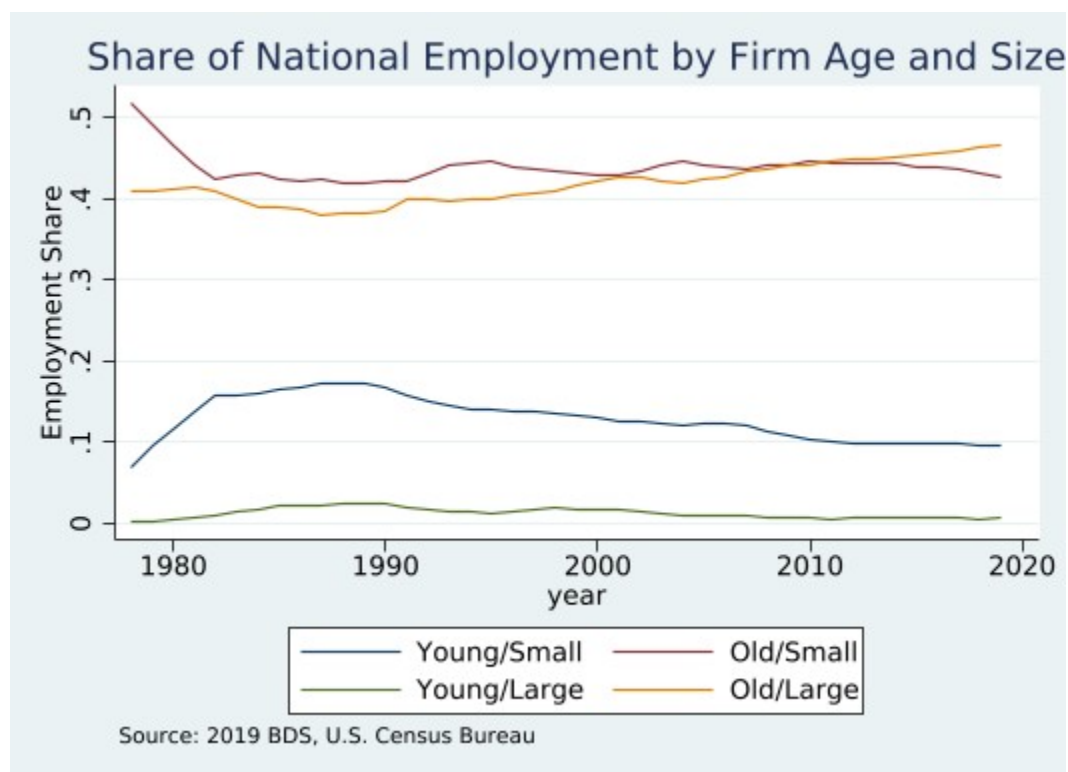
Figure 7.



Therefore, when it comes to the sources of economic growth and dynamism, firm age drives job creation more than firm size. As prior research has shown, young firms are more likely to

experience future employment growth than are small firms (Haltiwanger, Jarmin, and Miranda 2013). To this end, the BDS allows us to cross tabulate the firm size and firm age categories, and Figure 8 shows the share of national employment that belongs to the four age/size combinations. Employment at older firms is split almost evenly between small and large ones, while employment at young firms is heavily concentrated at small businesses. Employment at both small and large young firms has declined over time but the most dramatic drop has been at small, young businesses. The decline of the small start-up, combined with the low job creation rate of old firms, helps explain the overall secular decline in net job creation and general business dynamism.

Figure 8.



3. Geography

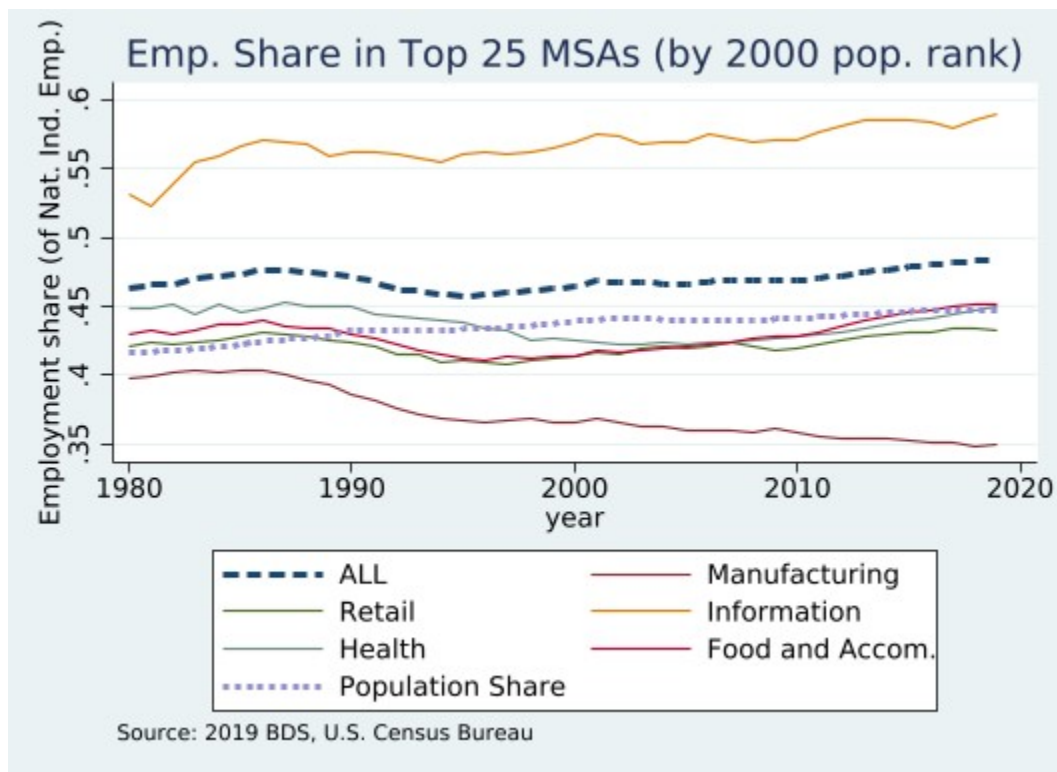
Because the BDS are calculated based on data from individual physical establishments, the information on employment and payroll can be assigned to a particular location. The BDS uses establishment geography to report employment changes by state, county, and Metropolitan and Micropolitan Statistical Area (MSA).³ Metro areas are defined according to the 2013 OMB delineations.⁴ By combining geographic and industry breakdowns, we can see how different types of businesses have clustered across the country over time.

For example, Figure 9 below shows that the share of jobs located in one of the top 25 MSAs (by population ranking in the year 2000) has approached 50% of national employment in recent years. This is a greater fraction than the overall population share located in the same MSAs, indicating higher percentages of people are employed in large urban areas. While large MSAs lost employment from the late 1980's to the mid-1990s, their employment share has been rising steadily ever since. The service sectors track the national trend most closely. The shares of national Food/Accommodation, Health, and Retail employment located in the largest cities dipped below the population share in those cities by the late 1990's but have recently returned to a ratio more in line with the percentage of people living in these places. In contrast, Manufacturing has steadily shifted employment away from large metro areas relative to other parts of the country, while the Information sector has steadily increased its share, even during the early 1990s.

³ While Micropolitan and Metropolitan areas are officially referred to as CBSAs, the BDS tables use the MSA acronym for both types of metro areas and therefore we follow that convention here.

⁴ OMB definitions for Metro Areas can be found here: <https://www.bls.gov/bls/omb-bulletin-13-01-revised-delineations-of-metropolitan-statistical-areas.pdf>

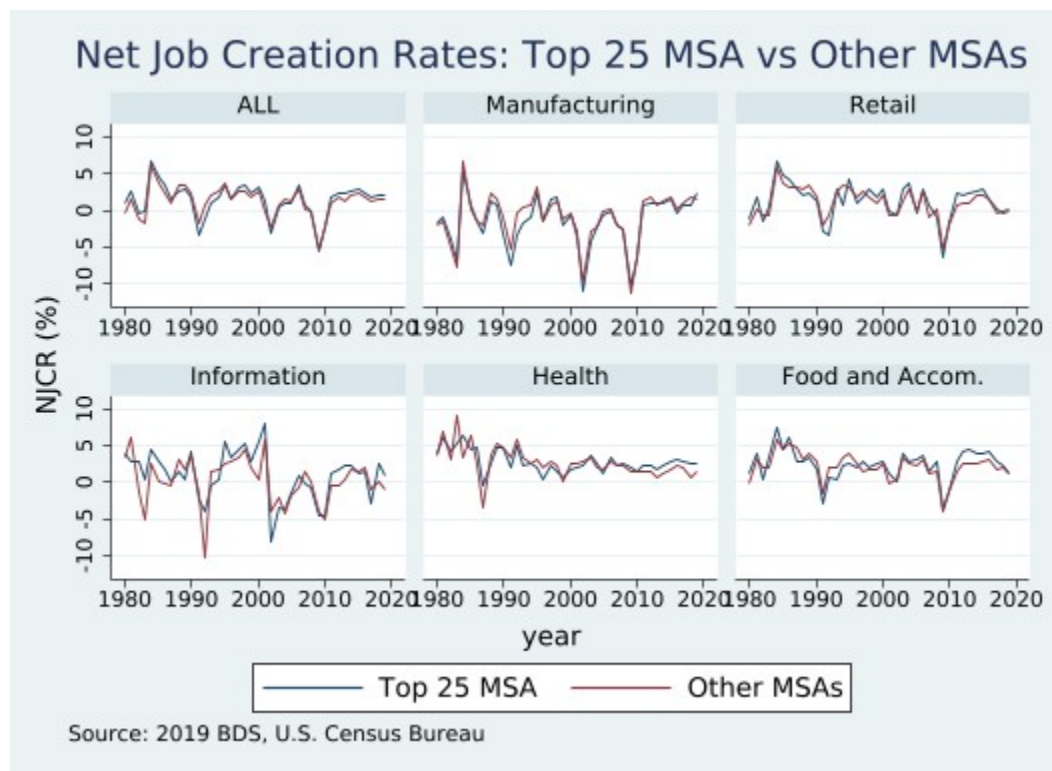
Figure 9.



While the growth in urbanization over the past two decades is well-known, it is not obvious what the consequences have been for job creation. Figure 10 plots the net job creation rates for the Top-25 metros versus the rest of the country, and shows that areas outside big cities did have higher net job creation rates during certain periods. This was especially true during the early 1990's when jobs moved away from the big metro areas. Industries like Health, Food/Accommodation, and Manufacturing created jobs at a higher rate outside of the top-25 metro areas for much of the time between the late 1970's and the Great Recession. As the economy recovered beginning in 2010, top metro areas created jobs at a faster rate other areas. This is particularly noticeable in Information, Health, Retail, and Food/Accommodation where the

NJCR rose above pre-recession levels in large cities but did not keep pace in the rest of the country. Among our five highlighted sectors, only Retail and Food/Accommodations have seen net job creation rates converge between big cities and the rest of the U.S. and then only in the last two years.

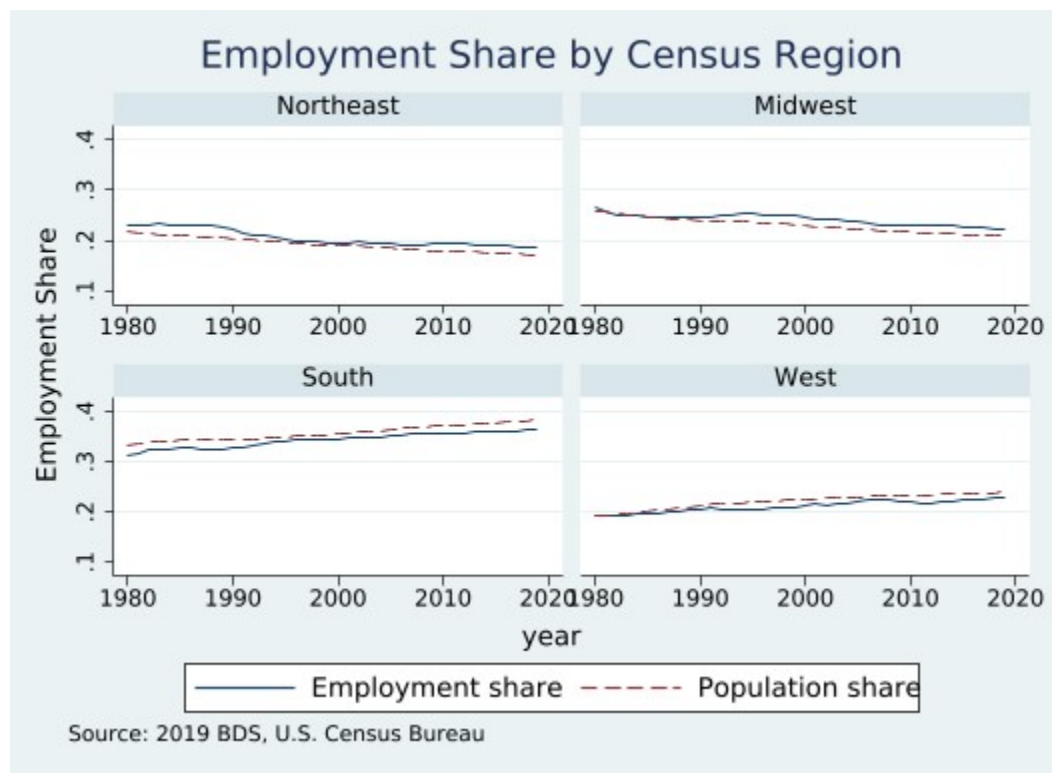
Figure 10.



To see the broader movements of employment across the country, we aggregate the BDS state-level statistics into the four Census Regions: West, Midwest, South, and East. As seen in Figure 11, the shift in employment across the four regions has largely mirrored the well-noted migration patterns to the Sun Belt across the South and West, and away from the Midwest and Northeast. However, despite losing population, the Midwest and Northeast have maintained a

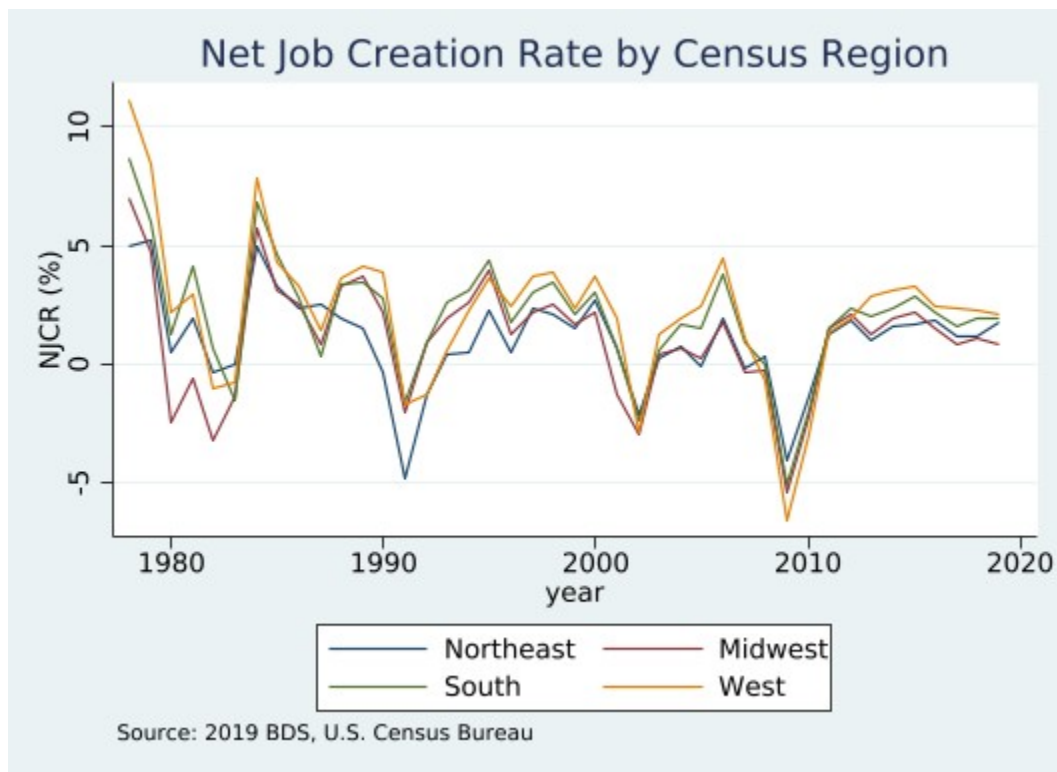
disproportionate number of jobs relative to their population. The relative low employment to population ratio in the South and West perhaps reflects their status as retirement destinations.

Figure 11.



The net job creation rates for the four regions are shown on Figure 12. We see that the West has generally had the highest rates of net job creation, especially during the boom years with the highest national rates of job creation. In contrast, the West also experienced the largest drop in the Great Recession. Other regions have had notable falls in past recessions, such as the Midwest in 1980 and 1982 (double-dip recession), and the Northeast in 1991.

Figure 12.



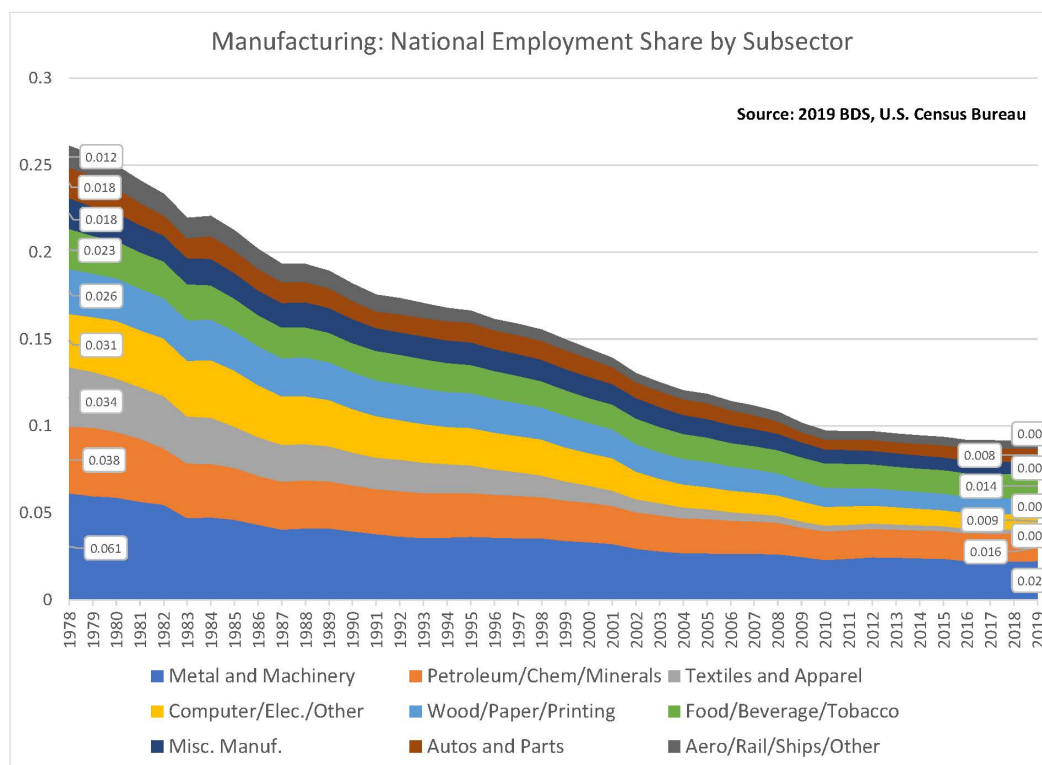
4. Detailed Industry

One of the great strengths of the BDS is the ability to examine establishment and employment dynamics by detailed industry groupings. Using data from other government agencies and Census Bureau surveys, NAICS codes are assigned to establishments and these codes enable the BDS to stratify employment by industry. NAICS codes were first created in 1997 and are periodically revised, usually every 5 years. Prior to NAICS, establishments were assigned SIC codes. To produce a consistent industry-level employment time series from 1978 to 2019, the BDS production system creates a vintage-consistent NAICS code, *vcnaics*, that assigns every

establishment throughout the time series a 2017 NAICS code (see Chow et al. 2021 for more detail). Once establishments have been assigned an industry code from the same vintage, we can investigate patterns in employment shares by industry over time.

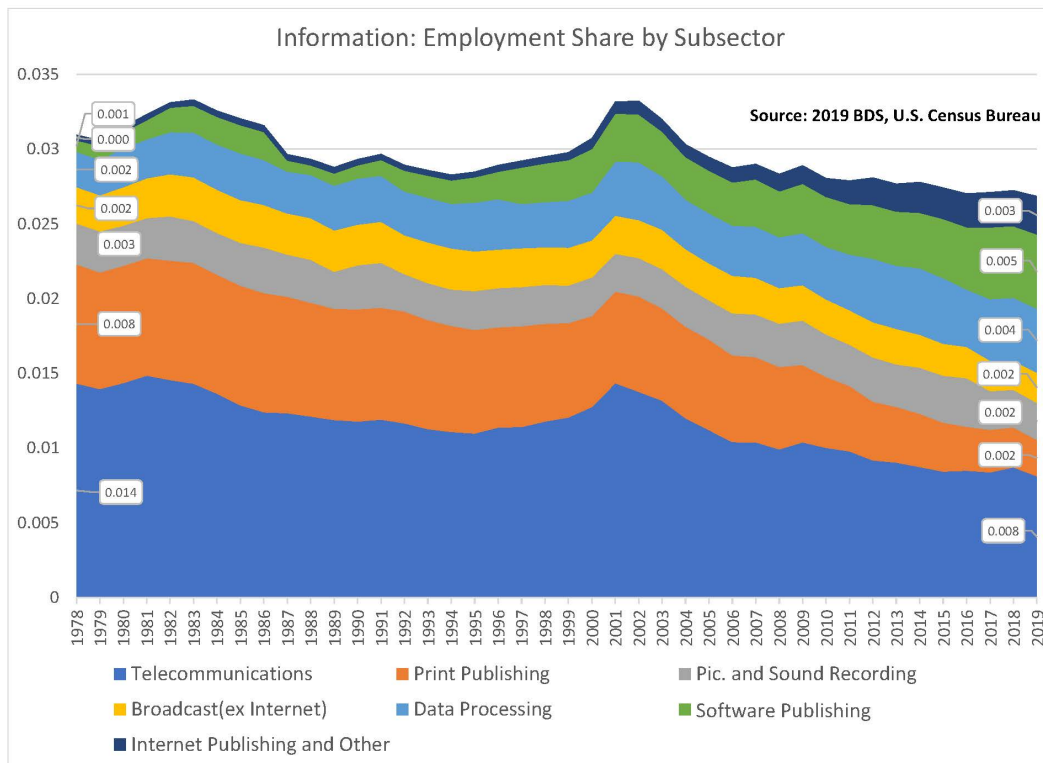
We begin by examining the share of national employment in manufacturing. In 1978, manufacturing establishments employed 26% of the U.S. private sector workforce. By 2019, this share had fallen to 9%. As shown in Figure 13, all the sub-sectors within manufacturing shrank but some declined more than others. For example, textiles and apparel fell from 3.4% to .002% while food, beverage, and tobacco fell from 2.3% to 1.4%. Metal/Machinery and Petroleum/Chemical/Minerals are the largest two sub-sectors in 2019, having fallen less than Wood/Paper/Printing or Computer/Electronics.

Figure 13.



In Figure 14, we show a similar graph for the Information sector. The rise of new information technology, in particular the internet, has produced clear shifts in employment shares. Software publishing, data processing, and internet publishing grew while print publishing and telecommunications declined. While an important part of economic activity, the information sector makes up a smaller percentage of overall employment than manufacturing, (2.7% versus 9% in 2019). Contrary to what one might have expected, this total share is slightly smaller than in 1978 (3.1%).

Figure 14.

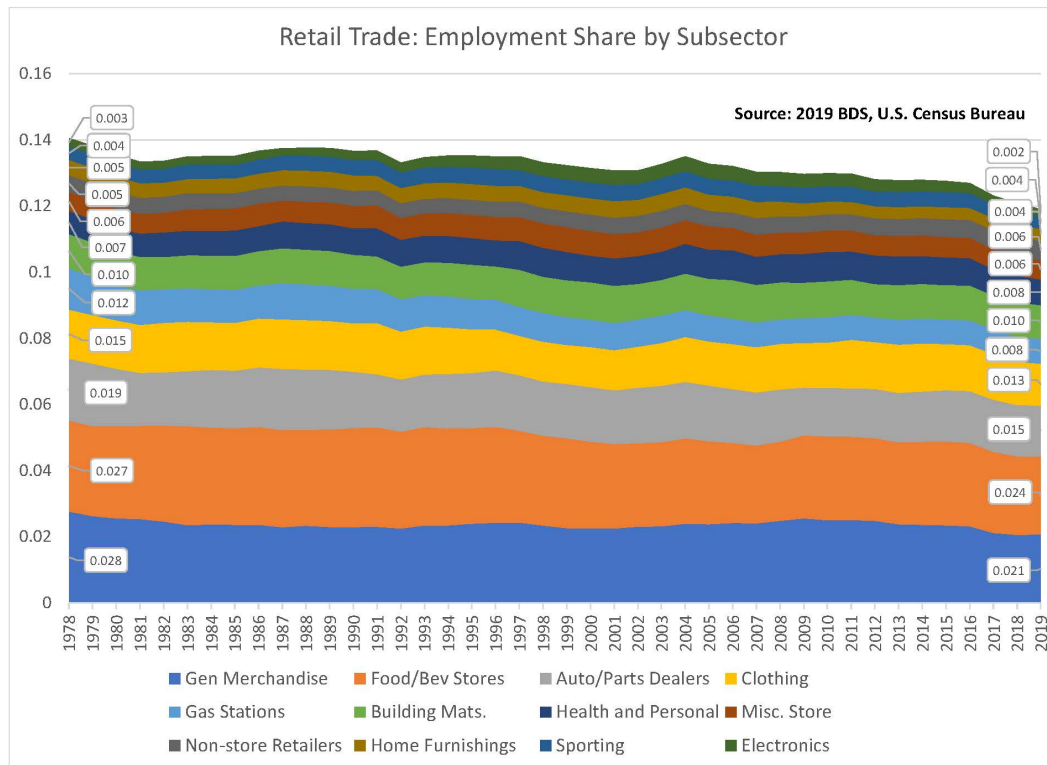


In Figure 15, we see that the share of national employment in Retail has also fallen slightly since 1978, from 14.1% to 12%. In some sub-sectors, such as gas stations, the decline is unsurprising given the move toward automation and self-service pumps. However even sub-sectors such as food and beverage stores, and general merchandise have shrunk slightly. This is largely due to retail establishments shrinking slightly in size. From 2004 to 2019, the number of general merchandise stores grew from 41,077 to 53,430 (26% increase) but over this same period, total employment at these stores fell slightly from 2.737 million to 2.734 million.⁵ This trend was driven by the establishment and employment dynamics of large firms, which opened 14,850 more establishments than they shut down between 2004 and 2019 without increasing total employment. In contrast, small general merchandise firms closed 1,602 stores on net and reduced total employment by 38%. Mid-size firms declined even more dramatically, closing more than half their establishments on net and reducing employment by over 70%.⁶ The combined effect is that employment in the general merchandise sub-sector has not kept up with national employment growth, as stores operate with fewer employees on average, but the share of employment at large firms has increased.

⁵ See BDS table 3-digit NAICS (https://www2.census.gov/programs-surveys/bds/tables/time-series/bds2019_vcn3.csv)

⁶ See BDS table 3-digit NAICS by Firm Size (https://www2.census.gov/programs-surveys/bds/tables/time-series/bds2019_vcn3_fzc.csv)

Figure 15.



Non-store retailers have become an important part of the industry in terms of their volume of sales, with e-commerce rising from less than 1% of retail sales at the beginning of 2000 to over 11% by the end of 2019.⁷ However, non-store retailers still represent a relatively small share of retail employment. Possibly some non-store retailers are sole proprietorships that do not show up in the BDS because they have no employees. Employment growth due to e-commerce may also be more evident in the warehousing and storage industry group (4931),

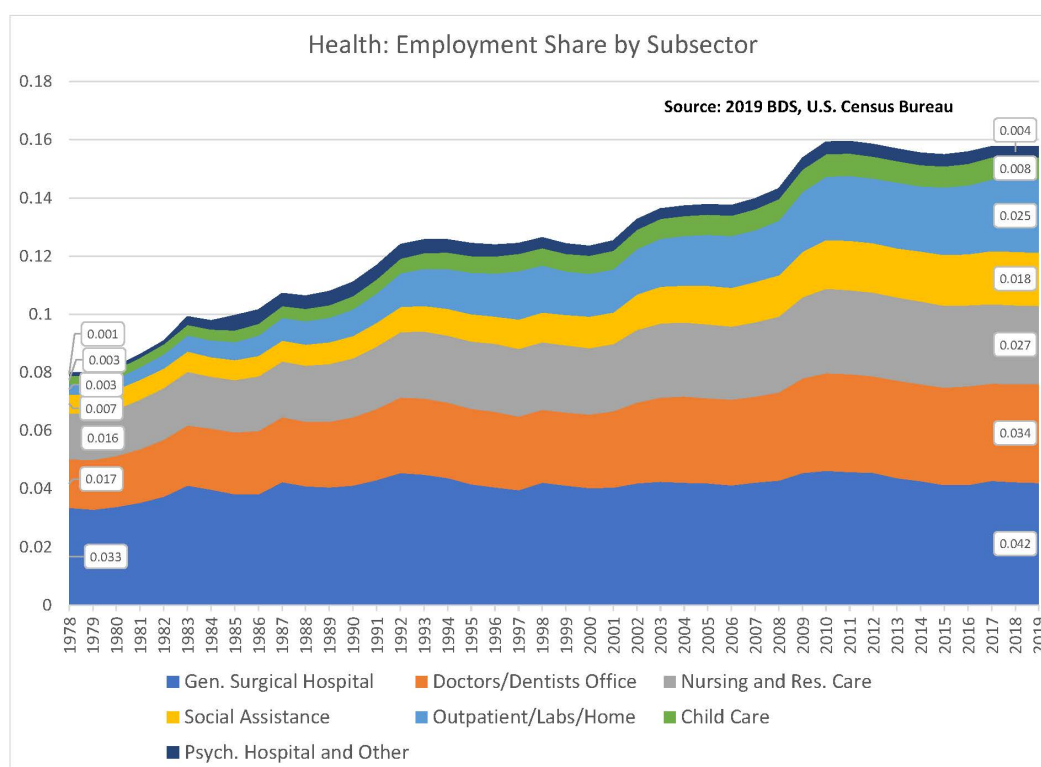
⁷ See www.census.gov/retail/index.html, quarterly e-commerce report, time series of adjusted sales

which has recently seen robust net job creation, averaging 6.5% since 2014.⁸ Many of these workers likely support distribution of online purchases.

In contrast to the preceding industries, the share of employment in Healthcare has almost doubled since 1978, rising from 8% to just under 16%, as shown in Figure 16.

Outpatient/labs/home healthcare was the subsector with the largest increase in share but doctor/dentist offices, nursing/residential care, social assistance, and childcare all grew.

Figure 16.

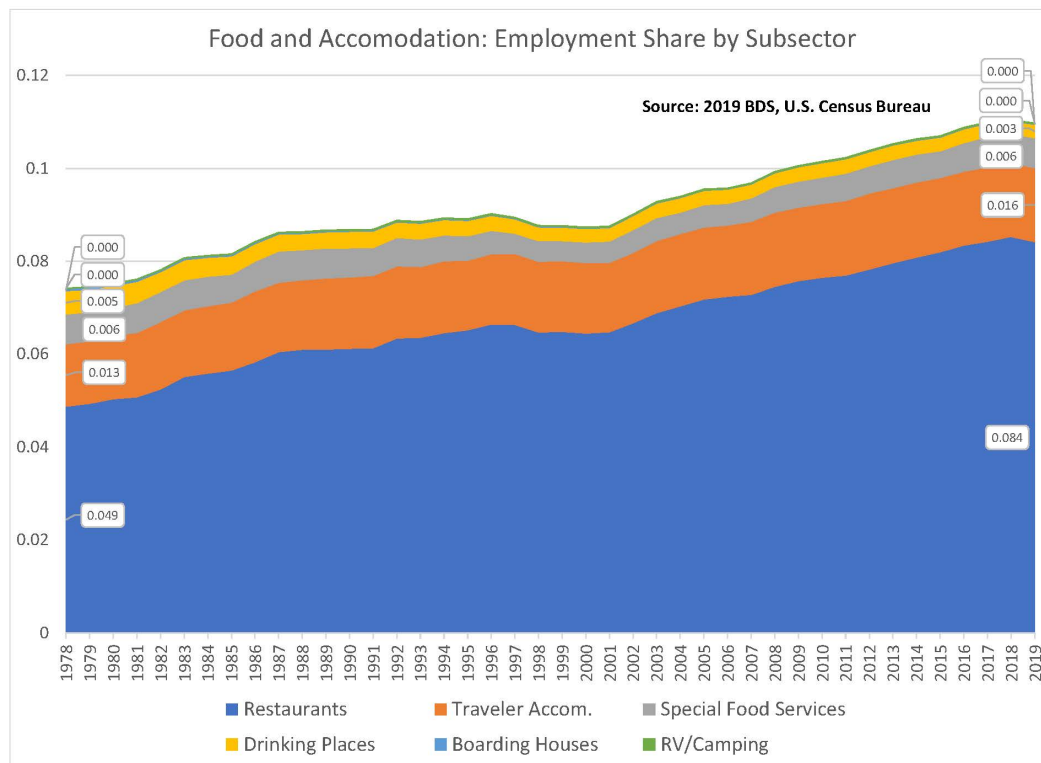


Finally, as shown in Figure 17, the increasing share of national employment in Food/Accommodations is almost entirely due to the rising share of employment at restaurants. Other

⁸ See BDS 4-digit NAICS table (https://www2.census.gov/programs-surveys/bds/tables/time-series/bds2019_vcn4.csv)

sub-sectors in this industry have remained relatively constant over time but the share at restaurants has increased from 4.9% to 8.4%.

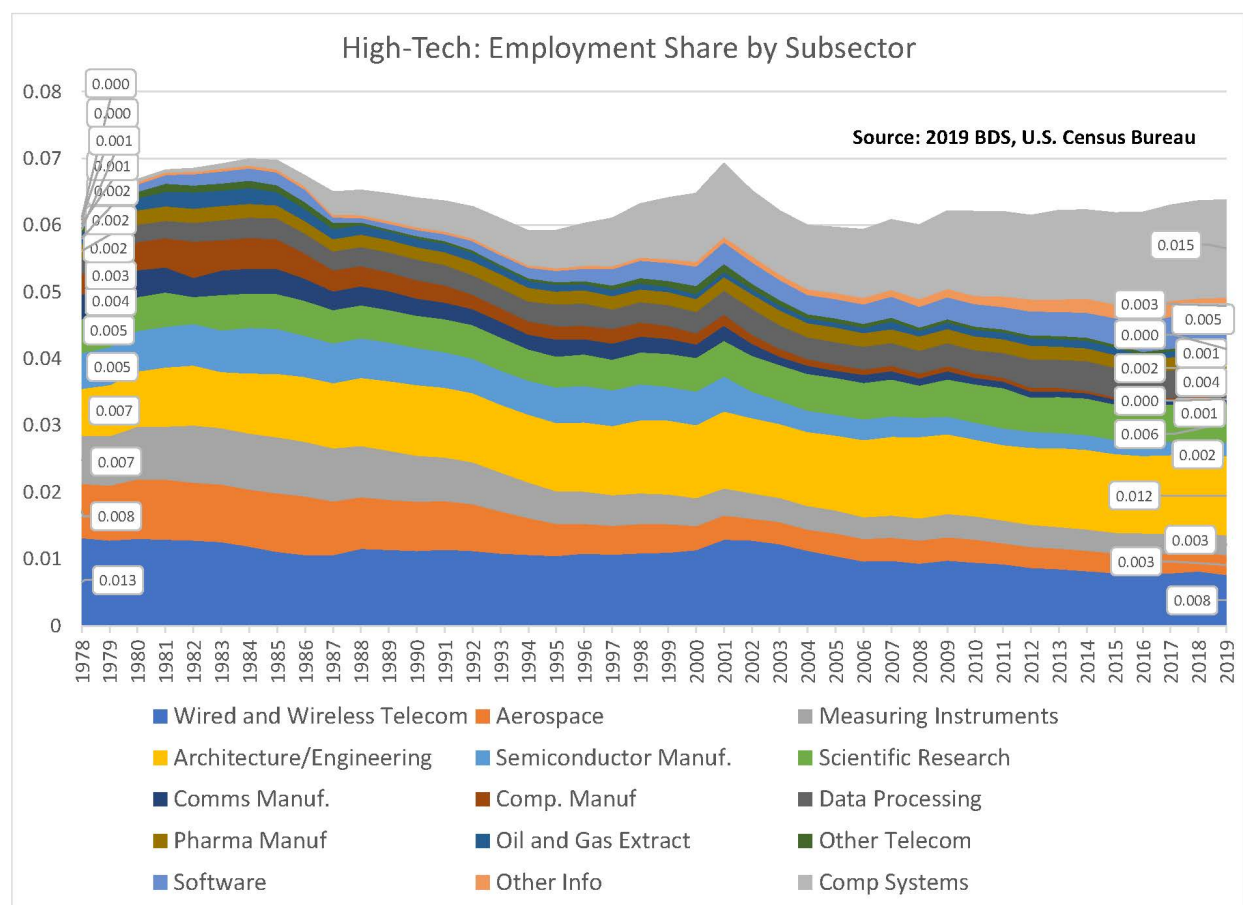
Figure 17.



We conclude our consideration of industry shares by combining a group of 4-digit NAICS codes to create a high-tech industry classification. These sub-sectors were chosen based on their proportion of STEM employment in 2005, 2012, and 2014 as measured using data from the Occupational Employment Statistics (OES) survey. To be considered high-tech, a sub-sector was required to have at least 5 times the national average level of STEM workers, where a STEM worker is defined as a technology-oriented occupation that performs work in “R&D, the development of scientific knowledge, or the use of knowledge to develop products or production processes.” (Goldschlag & Miranda, 2016) This list includes 15 4-digit NAICS

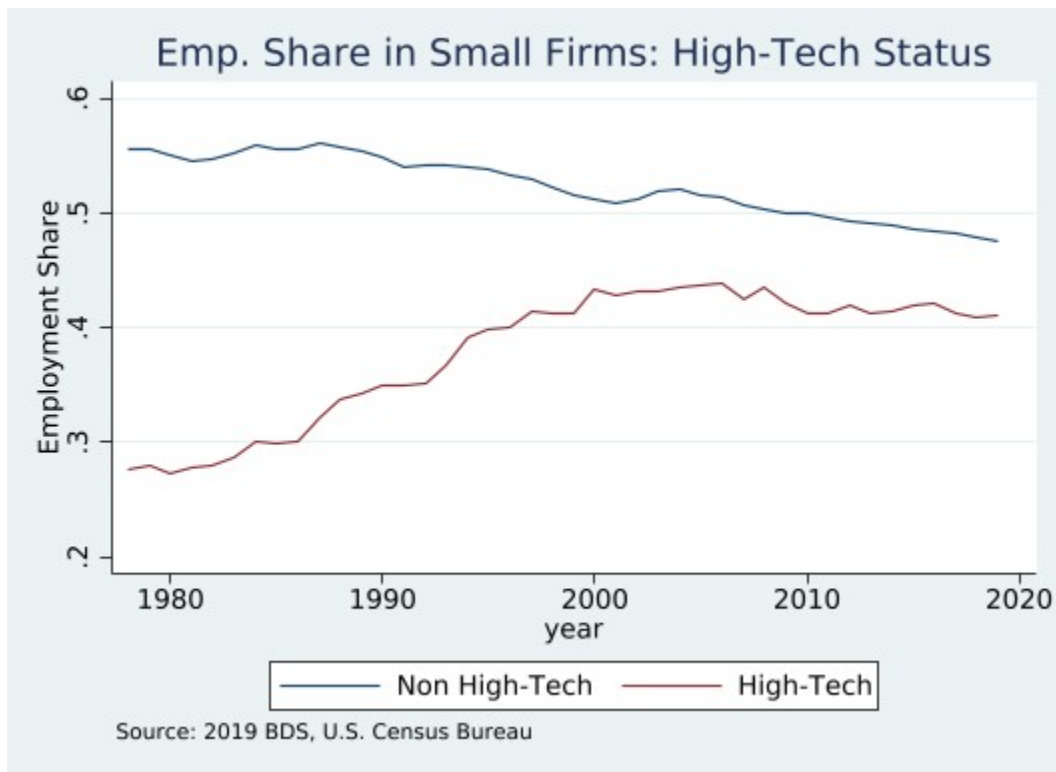
categories from mining, manufacturing, information, and professional, scientific, and technical services.⁹ Figure 18 shows that the share of employment in high-tech industries increased in the early 1980s and the late 1990s before declining in the late 1980s and early 2000s. Since 2010, the overall share has increased to 5.6%, driven by computer systems, architecture/engineering, other information, data processing, and software. However this share is still below the peak of almost 7% in 2001.

Figure 18.



⁹ NAICS codes aggregated to create the high-tech indicator: 2111, 3254, 3341, 3342, 3344, 3345, 3364, 5112, 5173, 5179, 5182, 5191, 5413, 5415, 5417.

Figure 19.



The share of high-tech employment in small firms has risen over time, rising above 40% in the early 2000s and remaining at that level since (see Figure 19). The share of high-tech employment in young firms peaked in 2001 at 17% and fell dramatically after that to 8% in 2019 (see Figure 20). In the late 1990s and the late 2000s, high-tech sectors had a higher net job creation rate than non-high-tech sectors. In comparison, the late 1980s and early 1990s saw lower net job creation rates in high-tech. The tech crash is evident in 2001-2002 when net job creation reached -10%. However recently, the high-tech net job creation rate has been close to the non-high-tech rate (see Figure 21). In spite of being a segment of the economy often associated with innovation, high tech industries have neither created large numbers of jobs in the last 10 years nor increased substantially in share. These BDS trends raise interesting

questions about the role of automation in high tech sectors and whether increasing substitution of machines for human labor will dampen job growth. Conversely, skill mismatch in the U.S. workforce may hinder the growth of high-tech firms as not enough workers with the requisite skills are available. While the BDS public tabulations do not provide enough information to answer these questions, the underlying micro-data can be used by researchers to investigate these issues.

Figure 20.

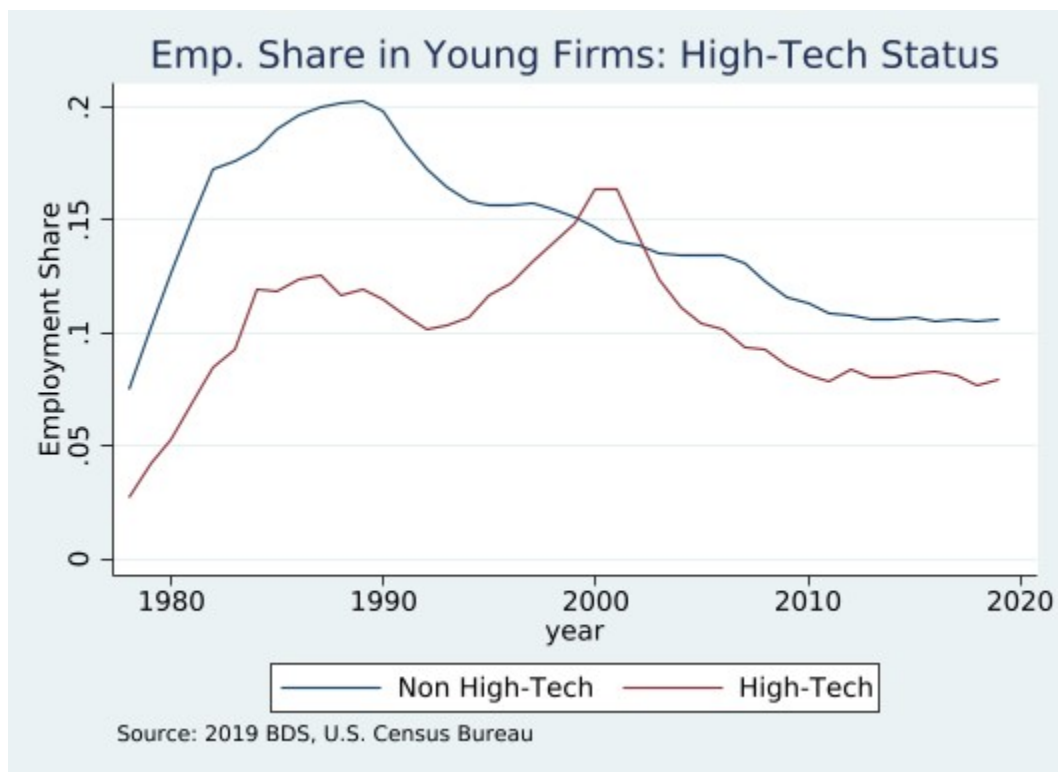
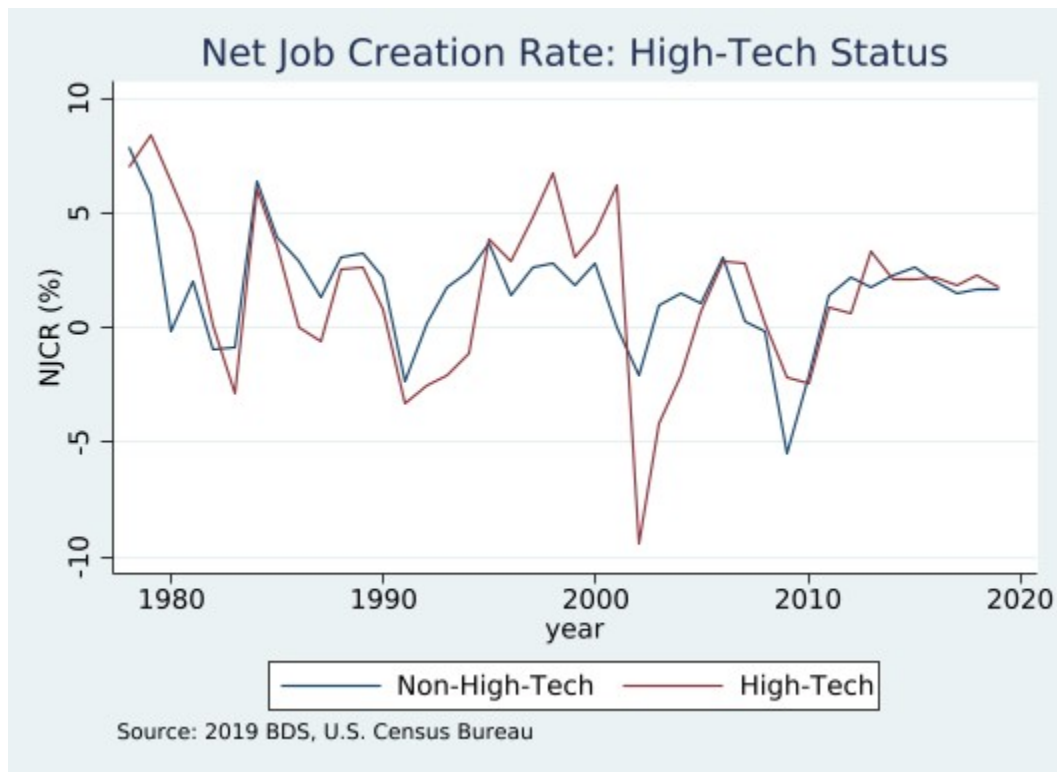


Figure 21.



5. Conclusion

This paper has described some of the broad trends and notable business dynamics in the U.S. economy over the past 40 years. By using publicly available data from the BDS, we can study these phenomena on very granular levels of geography, industry, firm age, and firm size. The data we use are available to download from the BDS website located at <https://www.census.gov/data/datasets/time-series/econ/bds/bds-datasets.html>. The data can be accessed in the form of the complete raw tables, or using an Application Program Interface

(API), or viewed graphically with the BDS Explorer tool.¹⁰ The underlying micro-data used to create the BDS, called the Longitudinal Business Database (LBD), are confidential but available for use in the secure Federal Statistical Research Data Centers by researchers with approved projects.¹¹ The next release of the BDS will take place in September 2022, publishing data through 2020. Since the BDS are published on a March 12th basis, efforts are underway to augment the release with an additional data product to better reflect the state of the economy during the Covid-19 recession in the early summer of 2020.

¹⁰ 2019 BDS Datasets: <https://www.census.gov/data/datasets/time-series/econ/bds/bds-datasets.html>

API Tool: <https://www.census.gov/data/developers/data-sets/business-dynamics.html>

BDS Explorer: <https://bds.explorer.ces.census.gov/>

¹¹ For more information about using the LBD please see:

<https://www.census.gov/programs-surveys/ces/data/restricted-use-data/longitudinal-business-database.html>

6. References

- Autor, D., Dorn, D., Katz, L., Patterson C., and J. Van Reenen (2020). "The Fall of the Labor Share and the Rise of Superstar Firms," *The Quarterly Journal of Economics*, Volume 135, Issue 2, May.
- Chow, M., Fort, T., Goetz, C., Goldschlag, N., Lawrence, J., Perlman, E., Stinson, M., and T.K. White (2021). "Redesigning the Longitudinal Business Database," *Center for Economic Studies Working Paper CES-21-08*. U.S. Census Bureau.
- Goldschlag, N., and J. Miranda (2020). "Business Dynamics Statistics of High Tech Industries," *Journal of Economics & Management Strategy*, Vol. 29, Issue 1, pp. 3-30, 2020
- Haltiwanger, J., Jarmin, R., and J. Miranda (2013). "Who Creates Jobs? Small versus Large versus Young," *The Review of Economics and Statistics* (2013) 95 (2): 347–361.